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Report on the Elk and Other Game Animals Using the Ranges in the Nationsl Forests Surrounding the Yellowstone Park

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R E P O R T

ON THE

ELK AND OTHER GAME ANIMALS USING THE RANGES IN THE NATIONAL FORESTS SURROUNDING THE YELLOWSTONE PARK.

By

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Report on the Elk Situation on the National Forests in the Vicinity of the Yellowstone National Park

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In considering the entire question of the distribution of the elk in this region it is important to understand at the beginning that there are practically three distinct herds of these animals, which, for convenience, may be designated as the Southern or Jackson Hole herd, the Northern or Park herd, and the Green River herd in the Bonneville and Bridger forests. The animals belonging to the Jackson Hole herd range only a short distance into the Park, a comparatively few crossing the continental divide which lies in the extreme southern end of the Park immediately south of the Yellowstone Lake. This divide runs from near the southeast corner of the Park towards the northeast for some distance then turns to the west about opposite the center of the western line of the Lake. The range of these elk is very definitely known, and with the exception of a few which straggle to the westward over the divide of the Teton watershed into the Targhee and Palisade forests, in Idaho, the majority of them spend their summer in the Wyoming State Game Preserve which immediately adjoins the Park on the south and of which over 600,000 acres lies in the northern end of the Teton Forest, about 85,000 acres in the extreme south-

eastern portion of the Targhee Forest, and 45,000 acres in the northeastern corner of the Palisade Forest lying west of the Teton watershed and extending to the Idaho State line. They winter south of the Wyoming Preserve within the limits of the forests, and also many of them on the ranges outside of the forests. On the other hand, the elk constituting what I shall consider as the northern herd, range in summer almost entirely within the Park limits in the northern end of the Park. The majority of them, probably between twenty and twenty-five thousand, range in the northeastern quarter of the Park along the Lamar River and its tributary. The rest summer in the Gallatin range in the northwestern section of the Park. This Gallatin herd has been estimated at between seven and ten thousand head. Thus we find in the Northern or Park herd two separate bands; one the Lamar herd of about 25,000, and the other the Gallatin herd of about 10,000.

Winter Ranges

The Jackson Hole elk winter almost entirely within the boundaries of the Teton Forest but occupying for the most part alienated lands or lands withdrawn from entry, not forest areas, and over which the Forest Service has absolutely no control. They drift ahead of the snow from the high ranges in its northern end, following the valley of the Snake until they reach

those large open areas in the southern end of the Teton in the vicinity of the town of Jackson and drifting on below as the winter conditions necessitate. Unless the snow becomes too deep and they are forced further south, a large number of these elk winter in the valley of the Gros Ventre, where there is a solid body of almost 200,000 acres of land lying in Tps. 42, R. 114 W., 41-42, 113 W., 41-42, 112 W., and 40-41-42, 111 W., which by a resolution to Congress dated April 28, 1909, the Wyoming State Legislature asked be set aside as a permanent winter elk and big game refuge. This resolution has never been acted upon by Congress.

In leaving the Park on the north the elk do so in large herds. I was told by well-informed men that it was not uncommon to see one continual band of elk move down through the open country to the east of the town of Gardner, numbering more than 7,000 head, not all in one solid close body, but a continual procession of these animals with scarcely any breaks. On the Gallatin side the same conditions have been noted, the elk leaving the Park and drifting out into the State Game Preserve lying to the northeast of the Park where they have the same protection from hunters as they have within the Park. The winter range in the northeastern section of the Park is, as I have said, not a wholly satisfactory elk range, but the range along the Gallatin is almost an ideal winter range for this class of animals, as it consists of beautiful meadows with large areas of willows and a great deal of browse and forage of that class which furnish the elk plenty of feed in the event the snow is

deep enough to cover the grass. The Southern herd works down along the Snake River valley in the same manner, there often being solid bands of the animals numbering three or four thousand head, all moving slowly along like an invading army.

Number of Elk in 1912

By actual count during last year Supervisor Miller of the Teton Forest reports that the number of elk seen and counted on that Forest by the rangers was 13,528. This includes elk of all ages, and as the count was made in March, 1912, when the snow was on the ground and the elk were located for the winter, he considers the count as being very accurate. To this number Mr. Miller adds 25 per cent to cover elk which were not found by the rangers during their count, owing to their being entirely off the Forest and also in certain parts of the Forest which were perhaps overlooked, which brings the total up to about 17,500. In addition to this number Mr. Miller believes that there are about two thousand more which really belong to the Jackson Hole herd which at the time of his count were on the Idaho side of the Teton range and outside of his jurisdiction. He believes that in round numbers there are 20,000 elk belonging to the Southern herd. I shall therefore consider 20,000 as covering the Jackson Hole herd, as those east of there are enumerated in the Green River herd. In making the count the rangers reported not only the number but the sex and age, which shows an average of one bull to every ~~three or four~~ four cows. Of this total of 17,500, about

6,000 winter in the immediate vicinity of the town of Jackson and three to five thousand in the Gros Ventre country, the balance being scattered around in various parts of the Forest and on the ranges outside of its boundaries. In the northern herd the count made by the Forest Service officials in cooperation with the Park authorities shows a total of 37,000 elk, the majority of which range within the Park limits during the entire summer and a large portion of the winter. I do not believe this count was as carefully made, however, as the one conducted by Supervisor Miller, and am inclined to believe from all I could learn that 30,000 will cover all the elk belonging to the Northern herd. Of these 30,000, approximately 20,000 drift inthe winter from the high mountain range in the northeast corner of the Park down the Lamar and Yellowstone rivers to the north, remaining within the Park lines just as long as the snow will permit them. The herd in the northwestern corner of the Park likewise drop down from the high ranges in the Gallatins into the open country along the Gallatin River, which is by far the most satisfactory winter range the elk have on the Park. It is very interesting fact to note that the elk have learned to stay within the Park lines until forced outside of them by the snow, finding security from the hunters who at the opening of the season line up against the Park waiting for the first animal to step across the boundary lines. However, when the winter conditions are such that the elk can not remain within the Park lines the drift of the northeast herd finds its way down the Yellowstone

valley and along the open country to the east of it. In the old days before the coming of the settlers in the Yellowstone and Gallatin valleys the elk used to drift down these valleys and out into the great unoccupied open ranges to the north where the snow seldom became deep enough to cause them any suffering. However, with the practical occupation of almost every acre of the bottom lands along the rivers where the elk especially delight to graze in the willows and meadows, they have been forced to remain back in the higher hills which are not ideal winter ranges for elk.

The Green River Herd

The summer range of this herd is found in the eastern slope of the Rocky Mountains in the high regions about the head of the South Fork of the Shoshone River in the Shoshone Forest, the various heads of the Wind River in the Bonneville Forest and the Green River in the Bridger Forest. Various authorities have estimated the number of elk on this side of the Continental Divide all the way from three to five thousand head, and from all available data I am inclined to place the number at not over 3,000 head at the outside, because of the impossibility of making a count that can be relied upon as not having included some of the animals twice. It is believed by those close in touch with this herd that it is decreasing in numbers yearly. If this is so it must be due to reasons aside from the question of range, because from personal observation of the winter and summer range of the herd on the Wind River portion they are well taken care of and have ample range for the number now there, and I under-

stand this applies to the other herds as well. On the Green River part of the range the summer range is said to be quite adequate, but should be protected from grazing, especially sheep. Probably seventy-five per cent of the winter ranges lie partly outside the forest boundaries and are said to be reasonably sufficient for their needs, if it is not allowed to increase to any great extent. The winter conditions of that part of the herd on the Bonneville Forest are about the same as on the Bridger, there being but a small part of it on the Forest areas over which the Forest Service has any control.

Number of Elk According to Early Authorities

In order to compare the figures of today with former estimates as to numbers a careful search was made through all the reports of the Park superintendents, game wardens, travellers and hunting authorities to see if any definite information could be discovered. Only a few writers, however, gave any figures as to the size of the herd as they found it. Colonel Chittenden in his book on the Park, estimates the number at about 30,000 in 1895. Chittenden spent several years in the Park as Engineer officer in laying out the roads, trails, and other improvement work undertaken by the Government, and is considered unusually well posted as to conditions there.

John Bonner, a writer and sportsman, in an article in Leslie's Weekly for September 1897, estimates their number at 30,000. Col.Allen,U.S.A.,in his annual report as Supt.of the Park for the year 1907 places the total number of elk in the Park at 30,000. The report of the Montana State Game Warden for 1907 places it at 25,000.General S.B.M.Young,U.S.A.,Park Supt., in his annual report for the year 1909 includes a very interesting report made for him by Mr. John Raftery of Helena, Montana,

an authority on the elk in the Park. Mr. Raftery's estimate places the number at 25,000 and he is very firm in his belief that elk are slowly but surely increasing in numbers. Probably the most satisfactory report on this question is that made by Emerson Hough the ~~well-known~~ writer and sportsman. In the winter of 1894 "Forest and Stream," the well-known sportsman's paper, sent an expedition into the Park for the express purpose of obtaining definite information as to the exact condition of all the game animals there. Hough was in charge of the party and they made a most careful search through every part of the Park with a view to establishing beyond question not only the numbers but their winter ranges and how they fared upon them.

Hough saw and counted between five and ten thousand elk in two days in one part of the Park and in his published report announced that in his judgment there were not to exceed 25,000 elk belonging to the Park herd at that time. Hough found the elk on their favorite winter ranges, most of them in snow three feet deep, saw few dead ones, and found them all in excellent physical condition. He states that this estimate is liberal and covered them all. It is noticeable that every writer on the Park elk, even as far back as the days of Dunraven, in 1874, feels that unless they received protection the herd would soon become extinct. Most of the writers allude to the hide and tooth hunters and the Indians as the great cause of this, although two or three writers as early as 1883 deplored the increasing number of settlers who were taking up

the winter ranges of the elk forcing them back into the deep snows of the high ranges.

Taking these estimates together, it is very evident that the herd of early days did not number any more, if as many, than it does today. While not one of them states definitely that they include the Jackson Hole herd in their figures, it is evident that they did not and that their estimate is for the Northern or Park herd as we today understand it.

Game Preserves

In order to properly protect the elk and other game animals, there have been established from time to time in the National Forests surrounding the Park large areas known as state game preserves. In additionto this we have also restricted the grazing of sheep from several large areas in the various forests and as far as possible have restricted all stock grazing up to a line one mile back from the Park lines, thus making an open strip that wide entirely about the Park. These game preserves were established for the protection of all game animals, but the elk are by far the most important and numerous users of them.

Wyoming Game Preserve

On the Teton Forest the Wyoming State Game Preserve extends entirely across that Forest on an almost straight east and west line lying practically north of Buffalo Creek, from its source in the mountains on the eastern side of the

Forest almost to its mouth in the Jackson Lake. To the west of the Lake a small stream which heads in the Teton range and runs almost due east into Jackson Lake directly opposite Buffalo Creek, makes an almost perfect boundary for the southern side of this game preserve. The area of the game preserve within the Teton Forest is 580,000 acres, and well-informed authorities believe that nine-tenths of the Southern herd of elk summer within its boundaries. From my own observation of the area I am sure this is correct, as the contour and nature of the country is such that the elk are not inclined to go north far into the Park. The Wyoming State preserve also covers that part of the southeastern corner of the Targhee Forest (8480 acres) and the northeastern corner of the Palisade Forest (45,824 acres) south of the Park on the western slope of the Teton range between it and the Idaho State line. This area covers approximately 140,000 acres, and extends from the western boundary of the Teton Forest at the summit of the Teton range westward to the Idaho-Wyoming state line. Its boundary on the south is the watershed on the north side of Badger Creek, a prolongation of the southern boundary line on the Teton, but bearing slightly southwest. The total ~~acreage~~ area of the whole preserve is about 700,000 acres.

On the eastern side of the Park on the Shoshone Forest no state game preserves have yet been established along the boundary of the Park, but we have always restricted the grazing of both cattle and sheep over a large area adjoining the Park within this Forest for the purpose of protecting the ranges for the use of the elk and other game animals. This protects the

elk in every way exactly as does the game preserve excepting that during the open season hunting is not prohibited therein as it is upon a regularly established state game preserve. A large amount of this area within the Shoshone is wholly summer range lying for the most part from one to two thousand feet higher than the Park ranges do and slopes directly into it. Hence when the winter snows come the elk naturally drift to the westward down the Lamar River rather than to the east. There has been considerable agitation towards having made into a state game preserve this area in the Shoshone of probably 300,000 acres lying east of the Park and extending over the divide to the east to a considerable distance down the various streams that rise in the divide and flow easterly, such as Sunlight, Crandall, and the North Fork of the Shoshone, and practically running the whole length of the Forest to the Montana-Wyoming line. The reasons advanced for this are that on a game preserve hunting would be prohibited within its boundaries, and instead of turning west at the approach of cold weather the elk would drift to the east and find their way down into the open country along the forks of the Shoshone and other streams which flow into the Big Horn Basin ~~to the east~~ which is an excellent winter range for elk and practically open to them now. There is no doubt but this was formerly a favorite winter range for the elk, because the old settlers there all agree that 25 or 30 years ago the elk drifted down into the valleys of the Shoshone and Clarks Fork every winter in very large numbers but the growing settlements along these rivers and the increased hunting gradually drove them back until now very few winter there. The advocates of making

this a game preserve believe that by having the game protected from hunting they would find their way to the country east of the Park and over the divide and then when the heavy snows come on the high mountains would be forced to remain in the lower country to the east, wintering there, thus utilizing a very considerable amount of winter range in that region. They contend that under present conditions hunting parties at the opening of the season range themselves along the eastern line of the Park getting just as close to it as they possibly can. The instant the season is opened the elk are hunted so persistently that they are forced back on to the Park where they can not be hunted and thus are not given any opportunity of getting over the high country east of them until the snow is too deep for them to do so. There is no doubt but that these are facts. I do not believe, however, that the settlers and residents in that part of the State of Wyoming would favor making this a game preserve. The town of Cody and also many settlers living along the Shoshone and other streams look upon the hunting season as their harvest time. Visiting hunters spend large sums every fall in outfitting at Cody, as well as in hiring horses, guides, etc. Many believe that if this area was made into a game preserve it would practically cut out the only available hunting ground which is open to hunters from that side of the State. If this entire area was erected into a state game preserve as far over the divide on the eastern slope as for example a north and south line which would pass close to Hunters Peak on the Crandall Creek watershed and Jaggers Peak south of Sunlight Creek it would doubtless offer a most satisfactory winter

range for a large number of elk. The major part of this area is wholly uninhabited; only a few cattle graze on the extreme eastern side of it in the Sunlight basin region and the ranges along those creeks and stream flowing from the divide eastward are excellent winter elk ranges. Moreover, from the nature of the country it will never be needed by the settlers excepting possibly miners, and they would not interfere with the game to any extent. It has no agricultural possibilities of any kind.

But if this was done the elk would surely remain there the year round working from the high country east of the Park over the divide and down into the creeks and streams for their winter feed. Being a game preserve hunting would not be allowed and as they would have no reasons to leave it for feed the elk would stay there and elk hunting in this part of Wyoming with the hopes of obtaining an elk would be a thing of the past.

The solution of the whole thing is in a change of date for opening the hunting season. Make it six weeks later, thus giving the elk a chance to cross the divide and work down into the winter ranges and they will unquestionably do so. The man who hunts elk in that country will earn every pound of elk meat he secures, for it is rough enough to give the animals a chance for their lives and prevent wholesale slaughter such as now disgraces elk hunting around Gardiner, Montana, north of the Park. We are now protecting the elk by restricting stock grazing on this large area and in my opinion this is amply sufficient to give all the range that is needed for the elk

on this side of the Park and furnish the hunters with a first-class hunting ground where there is plenty of feed for their horses and splendid places for establishing hunting camps. I think this matter should be left wholly to the State authorities and be neither initiated nor ~~passed~~ proved by the Forest Service.

The Jardine-Slough Creek Trail Area

To the north of the Park the Forest Service has set aside for the use of the elk an area of about 60,000 acres lying in the Absaroka National Forest south of what is known as the Jardine-Slough Creek trail upon which sheep grazing is not permitted. Prob-

ably no step which has been taken towards the protection of the elk has caused so much friction between the stockmen and the various interested parties as has the setting aside of this area as a winter range for the elk. When the matter was first agitated by the game wardens and others interested in the protection of the elk, it was their intention to secure the exclusion of sheep from the entire area within the Absaroka Forest lying north of the Park from the western line of the Beartooth Forest on the east to a north and south line through the town of Jardine, which lies just on the Forest boundary to the west, and as far north as the watershed would carry it, an area approximately 12 miles wide and about 25 long. This area has been occupied by the sheepmen for several years past who were induced to take up ranges in there by our representations that it was a good sheep range. All of this area lies much while rough higher than the park, all the streams in it flowing into the Park, and when the demand for exclusion of the sheep was made upon the District Forester it was believed it would be an injustice to the sheepmen who were there practically at our solicitation and also that much of the area could not be properly considered winter range for the elk. After a very considerable discussion of the matter between the sheepmen, the Governor, the Park authorities, and representatives of the Forest Service the District Forester was unable to secure any harmonious action by the various interests represented at the

meetings as to the area to be withdrawn from sheep grazing for the protection of the elk and was forced to act in the matter upon his own judgment as seemed just to all concerned. A temporary line was established excluding all sheep from the range lying south of the trail which has been used for many years between the town of Jardine on the western boundary of the Absaroka Forest and the country in the vicinity of Slough Creek. The number of sheep using this range at this time was about 7,500 head and in establishing this excluded area the District Forester arranged to take care of these sheep on other unused ranges so that no injury was done any of the occupants of the range by the change. The trail between Jardine and Slough Creek is a very crooked one and the width of the area lying between it and the Park line varies greatly. In some places it is eight or ten miles distant from the Park line and in other places it runs down to within a mile or two, due to the nature of the country over which it passes. As a general thing the area is about three miles wide by 29 long and covers approximately 60,000 acres of land much of which is very heavily timbered and some portions of which afford excellent grazing. I made a careful inspection of this entire area going over every part of it which seemed necessary in order to arrive at a definite conclusion as to the conditions which exist there and also discussed its possibilities as an elk range with everybody whom

I could see who was supposed to know anything about it. There is no question but the elk have always used a part of this area for a winter range. There are very large meadows along Hell Roaring, Buffalo and Slough creeks which all run down into the Park, upon which the elk find excellent winter feed. I am inclined to believe from all I could learn that during winters of unusually heavy snow the elk would have to leave this country entirely and drop down into the Park and find their way around into the open country to the north and west, but on an average I presume this would only occur once every four or five years. However, every settler with whom I talked, the Park authorities, hunters, and others interested in the question admitted frankly and freely that few elk used this area above the Jardine-Slough Creek trail. Here and there a small band of bulls have been known to winter in the high country above the trail but generally speaking it is not a winter elk range nor has it ever been in the past. I do not think now that any large number of elk use it as a winter range, but unquestionably it is used by them to a certain extent and the setting aside of it as far as the trail seems eminently right and proper from every point of view. The main value and the greatest result from the setting aside of this area, however, is for its use by the hunters. I think if we were to advocate the establishment of it as a game preserve upon which all hunting would be stopped it would be one of the

most unpopular movements that could possibly be inaugurated. As in Wyoming, so here in Montana I found the majority of the public were far more interested in killing the elk than they were in preserving them, excepting that they believed in preserving them so that they could be killed. In other words, they look upon the elk as a meat and sporting resource to be preserved and protected only for that reason. Therefore the establishment of this Jardine-Slough Creek area is satisfactory to all but the sheep owners, because it furnishes the hunters who flock to Gardner at the beginning of the season an admirable area where they can go and find splendid horse feed, good hunting grounds all lying immediately adjacent to the Park.

The Montana Game Preserve

At the northwestern corner of the Park on the Gallatin Forest is an area of 66,560 acres in what is known as the Montana Game Preserve, which includes the high mountain ranges along the Gallatin River. This game preserve also covers a large area of country along the Yellowstone River outside of our Forest boundaries. In addition to this ~~acres of forest land over which the~~ Montana Game Preserve ~~extends~~, we have set aside another area in the Gallatin Forest covering approximately ~~400,000~~ 120,320 acres immediately adjoining the state game preserve on the north and lying principally on the eastern side of the Gallatin River. On this area all sheep grazing

is positively prohibited and only cattle and horses are allowed. This state game preserve lies both north and west of the Park as it extends to the south along the western line of the Park as far as the summit of the watershed between the Madison and Gallatin rivers. It constitutes the most ideal summer and winter elk range in the entire region, and when considered in connection with the area restricted from sheep grazing, takes care of those elk using the northwestern corner of the Park in a very satisfactory manner. South of the Gallatin Forest and Montana State Game Preserve, on the western side of the Park, is the Madison Forest, on which all sheep grazing is restricted over a large area lying adjacent to the Park, but I understand comparatively few elk utilize it, doubtless because the area both in the Madison Forest and the Park adjoining it, is not a very good elk range. This makes an area of forest land covered by state game preserves surrounding the Yellowstone Park of approximately 751,864 acres upon which all stock grazing is prohibited, and 480320 acres on which sheep grazing is prohibited, or a total of approximately 1232,184 acres which is practically Park land in so far as its use by the Park elk is concerned. The majority of these game preserves and restricted areas are purely summer ranges. Probably not over 25 per cent of them can be classed as winter ranges during seasons when the snowfall is at all heavy. Based upon the carrying capacity of

like ranges in their vicinity, they represent range for approximately head of cattle or head of sheep. Many of the higher ranges are suitable only for elk, being too rough for either sheep or cattle, while others are so situated as to be practically inaccessible to any but the game animals. In each of these are large areas of fine grazing land which for various reasons the elk do not occupy. This is noticeable in the Teton division of the Wyoming Game Preserve, where there is some of the finest summer range for either cattle or sheep I have ever seen and over which comparatively few elk ever range, except possibly as they leave in the fall or return in the spring.

Losses

Supervisor Miller of the Teton is of the opinion that in the summer of 1909 the number of elk belonging to the Southern herd was approximately 35,000 head. He believes that at the present time this number has been reduced by 50 per cent, and from his observation is satisfied that fully 75 per cent of each year's calf crop died during the last three winters. There are also many other well-informed persons who are quite positive that up to the year 1909 the number of elk in the entire Yellowstone regions was much greater than it now is. On the other hand, there are many equally well-posted men who believe that the number of elk there was slowly but steadily increasing in numbers up to the year 1909 when the heavy losses began which were due entirely to unusual climatic conditions. They offer reasons for this belief with which I fully agree, basing them upon my own personal observations of game matters all over the west covering a period of thirty years. These reasons I shall give in full hereafter. Under normal conditions I feel this increase should continue and the herd to grow unless again reduced by unusual or artificial conditions. In 1907 the Wyoming law allowed only one elk to be killed each yearand an open season of but one month. In 1912 the number is three and the open season covers a full three months. If the elk are decreasing why have the state game authorities allowed such a heavy increase in the number to be killed by hunters and given them more time in which to do it.

Regarding the number of elk in 1909. Based upon my observations and experience in losses of range cattle under about the same conditions that caused the elk to die, I am inclined to doubt Mr. Miller's figures. The average observer is always inclined to more than double the actual losses in such cases, because he sees a large number dead in one particular place and assumes that the death loss has been the same on all parts of the range. It is difficult to get a satisfactory estimate from any of the residents of that region as to the size of the herd a few years ago and the losses since then, but I am inclined to think that in all probability the maximum size of the herd in the Jackson Hole region for the last ten years has never been over 25,000. So far as the losses of the last decade are concerned they have been confined principally to the winters of 1909, 1910, and 1911, especially in the winters of 1909 and 1910 when extremely deep snows followed very dry summers and the grass made comparatively little growth, and when the elk came down on to the winter ranges they soon grazed them off. It is generally admitted by interested parties well posted as to conditions in the Jackson Hole region during the winter of 1910-11, which was abnormal, that between 2,000 and 2,500 head of elk died that winter from the Jackson Hole herd. Considering the range conditions at that time and allowing for a normal death rate from natural causes, this is not an extremely heavy loss. Allowing the herd numbered 20,000, it is between 10 and 15 per cent, which is often exceeded in the losses among range cattle during a hard winter. These figures are not given

to minimize or belittle the losses, but only to show they have probably been overestimated and that under normal conditions there is no danger of the herd becoming extinct.

Because most of the losses occurred around Jackson Hole, where they had been fed during previous winters, it seemed as if the whole herd was doomed; but the fact is that probably 75 per cent of the losses took place within a very small area about the Hole, and they did not die in anything like such numbers in other sections of the region. If the losses of the elk during those winters was large it should also be remembered that the losses of domestic cattle and sheep was tremendous all over the State of Wyoming. Based on general estimates made by different stockmen well posted as to the range conditions in the State of Wyoming, it is unlikely that nearly a million sheep, and probably 50,000 head of cattle, either starved to death the winter of 1910-11 on the public ranges in the State of Wyoming or were shipped out to save them from dying. These were losses that were beyond the power of the ordinary man to meet, and must always be expected where owners of live stock depend for forage for their herds on the public ranges. But these losses are not to be counted on every winter. Western stockmen looking back over a long series of years know that about once in every five years there will be a hard winter when the losses will be more than normal.

Losses Generally in Calves

Everybody interested in the Jackson Hole country and elsewhere admit that the elk losses have always been confined

mainly to calves and yearlings, and for this reason I am inclined to think that the tremendous reductions in the herd are not founded on facts, because if we assume that the estimates are correct and approximately 75 per cent of the winter losses were in the calf crop, it is safe to believe that the remnant of the calf crop which lived through it kept the main herd very nearly even in numbers and thus the reductions could not have been so heavy as many believe. In other words, while there unquestionably has been some reduction in the numbers in the last two or three years, I am of the opinion that based upon a long period of years there are almost as many elk in that region as have been since the settlers began to come in.

Losses in Early Days

Nor are these recent losses the only ones from which these animals have suffered ~~from~~. Old hunters and settlers are unanimous in their statements that in the early days every few years a winter of unusually heavy snows caught the game animals and many died on consequence.

During the year 1907 a committee appointed by the Order of Elks made a trip into the Yellowstone region for the purpose of reporting to that Order the true conditions surrounding the elk, with a view to taking such steps as the order might believe necessary to save these animals from what was popularly supposed to be an impending extinction. This committee made a full investigation and received hundreds of letters from interested parties regarding the matter.

Regarding this question of losses, Mr. William L. Simpson of Meeteetse, Wyoming, an old resident of that part of the state, informed them that during the severe winter of 1897 "not less than 10,000 head perished from starvation." Of these Mr. Simpson estimated that 6,000 head of yearling elk died on the proposed winter range in the valley of the Gros Ventre River. Moreover, during such winters the Indians followed the elk and deer and slaughtered them by the thousands in the deep snows, adding to the general reductions in numbers. Again, in those days there were far more predatory animals to prey upon the game. Large numbers of wolves, mountain lions, and bears were to be found in every part of the country both winter and summer, and their depredations on the game must have caused enormous losses in numbers. Today these animals are comparatively scarce, because of the constant warfare kept up on them by the stockmen and hunters. Another cause which operated to keep down the number somewhat was the total absence of protective laws covering the killing of game. A single illustration will make this point clear. During the winter season of 1885, twenty-seven years ago, Mr. W. E. Alexander of New Fork, Wyoming, who ran a little frontier trading station on the headwaters of Green River, purchased from hunters and others the hides of 2,200 elk which were killed in the immediate vicinity of their place. These hides were shipped out for tanning purposes. If such a number could be purchased at one trading point, it is a fairly safe estimate that this represented but a very small part of the winter kill in the

entire region of the elks' winter range. It was several years after this before any restrictive laws were passed which regulated the killing of the elk.

Every one acquainted with the earlier days in the far West can recall the almost wanton slaughter of game animals besides the buffalo. The whole country lived upon game. Trappers thought nothing of killing a fawn to bait a trap, using only a small part of the carcass and leaving the rest to rot. Often a fresh animal was killed for each trap although it was but a short distance between their locations. Military posts with four and five hundred men found a goodly part of their meat ration in the game, and any one who lived near one can recall the hunting parties that used to go out during the fall and winter returning with six-mule teams loaded down with deer, elk, and other game. These things I have seen over and over again in California and other western states. Lord Dunraven in his interesting book recounting his hunting experiences in the Yellowstone Park in 1874, speaks of the thousands of elk and buffalo killed for their hides alone, and believed that if not protected from such destruction they would become extinct.

As for the Indian, he lived upon game the year round, and while they never killed for the pure lust of killing as does his more civilized white brother, still their demands upon the game were heavy and not confined to the males but took in everything that would make meat. All these causes, therefore, in my judgment operated in the past to keep down

the number of game animals to a certain extent--otherwise the country would soon have been overstocked with them--and are my reasons for believing that today comparatively speaking there are almost as many elk as at any time within the recent history of the western country since its settlement began to make inroads upon their ranges.

Feeding the Elk

During the winters of 1908-09 and 1909-10 the papers were filled with accounts of the losses among the Jackson Hole elk, and Congress was appealed to by the State Legislature of Wyoming to appropriate funds for the purchase and feeding of hay to save them from destruction.

During the winter of 1910-11 the State of Wyoming spent the sum of $1,500 in purchasing and feeding hay to the Jackson Hole elk.

In the winter of 1911-12 a federal appropriation of $20,000 was available for the feeding. The State spent for hay $3,406, and the federal authorities $5,872, at an average cost for the government purchases of $8 and for the state purchases of $7.50. This price included hauling and feeding the hay to the elk on the ground, and can not be considered as exorbitant under the conditions of its purchase.

The hay secured during the winter of 1910-11 was limited because there was a scarcity and the settlers could not spare more from their own stock. Shipping it in was, of course, an impossibility. During the succeeding winter, however, there was plenty of hay to be had and the amount

purchased probably represents very closely the needs of the elk at Jackson Hole for a severe winter when feeding may be deemed necessary.

A little hay is raised by the Park authorities, and fed near Gardiner, at the northern entrance of the Park, but the amount is not very great and does not make much impression upon the elk one way or the other.

Feeding the Elk in Winter

As previously stated, the state and federal governments have each spent considerable money in winter feeding the elk, especially in the Jackson Hole region. If one asks the average Wyoming rancher outside the Park region about this winter feeding and why it has been done only around Jackson Hole, they will almost to a man say that it was because the Jackson Hole settlers had a lot of hay to feed and no cattle to feed it to or other means of disposing of it, so they raised the cry of starving elk to find a market. There is undoubtedly some truth in this statement, because while probably the winter losses for certain years were quite as heavy among the Park herd as in the Jackson Hole herd the ranchers on the northern end of the Park had a ready market for all their hay and needed no artificial demand to stimulate its sale.

Nevertheless, taking the prices obtained for their hay, the Jackson Hole ranchers if they did raise this cry to obtain a market, can not be accused of holding the government up when the time came to make a sale, for they charged what

may fairly be considered as a reasonable price under the existing conditions although probably more than they could possibly have received for it without the government purchases. However, no matter how it came about there is no doubt but the hay fed saved many elk thatwould otherwise have died.

As a business proposition and considering the general welfare of the wild game, I do not believe it is a good plan to winter feed them excepting in emergencies. Every western cattle man knows to his sorrow that cattle fed hay for a winter or two learn to expect it and instead of rustling for themselves on the ranges, begin to concentrate upon the old feeding grounds early in the winter and must be fed or they starve. Thus they lose much of their natural instinct to take care of themselves and become pampered and spoiled. The most humane, intelligant method of caring for them would be to handle them exactly as a western cattle man would a range over which he had absolute control, and keep down the number to a point where under normal conditions they would take care of themselves the year through. The elk is a natural lover of snow. Left to themselves they will leave an open valley with no snow on the ground and drift up into the hills at evening to find a bed ground where there is two or three feet of snow. Not only this, but they will paw down through that much snow and get at the grass underneath if there is any there to rach, and do well on it.

The only time when elk should be winter fed is when due to abnormal winter or weather conditions there comes a heavy crust on top of the snow and the animals can not get through it to the feed underneath. This only happens at rare intervals and for such time there is no alternative but feeding to avoid losses. To meet this, hay should be purchased regularly each summer from settlers and stored at convenient points for winter demands. In Australia the sheep owners set aside a sum of money for an insurance fund with which a certain amount of hay is bought each year, hauled out to their ranges and stacked away for emergencies. They may not need it for several years, but when it is needed it is there for instant use. Hay properly baled and stacked will keep good for almost unlimited periods and occupies a very small space. If the state put away each summer say a thousand dollars worth of baled hay against such an emergency, it would accumulate until when the time for feeding did arrive there would be sufficient on hand to answer every call, yet the cost for any one year would not be great. This in my opinion would be far cheaper in the end than for the Government to attempt to purchase the land and raise the hay, a system that is bound to make the hay cost ten times as much as if purchased in open market.

As for the Park herd, if winter feeding is ever necessary this same principle could be followed with it, excepting that for want of settlers the Government would have to have the hay put up by contract.

On Slough Creek alone there are several of the finest meadows I have ever seen. They are heavily sodded with the best of grasses and lie close to the winter ranges where the elk could be gathered for feeding.

I can see no reason why the Park authorities could not contract with individuals to put up hay on these meadows each fall at a certain price per ton, in the stack, either baled or loose. From long experience in handling western meadow hay, I feel sure that on a contract covering several years, so that a contractor could afford to purchase sufficient machinery, hay could or should be put in the stack for not over $4 per ton, and under competitive bids probably for much less.

To cut three hundred tons of meadow hay on the Slough Creek meadows just below the Park line would be a very easy matter. The hay is there in wonderful quantities and there are possibly a thousand acres, taking the whole string of them, on which one could cut a ton and over to the acre every year. Then by cutting some each fall sufficient would accumulate in a few years to feed all the elk in the Park if need be. As to the feeding proposition, my opinion is that the older elk need not be fed excepting as a last resort. They seem able to take care of themselves under the most adverse conditions. The losses are wholly in the young animals, the yearlings and the calves. These could be separated from their mothers by means of "creeps" such as are used by stockmen to feed lambs, and cut calves away from

their mothers. The elk will enter the feed yards easily enough and when the calves have been separated the old stuff goes out and the calves can them be fed by themselves and will get the full benefit of the hay. Preparations for watering them would have to be made, but this is a matter easily handled. Probably ninety per cent of the Northern or Park herd winter within ten or fifteen miles of the Slough Creek meadows and the bulk of them much nearer, so that they would not be far away in the event it became wise to feed them. They would have to build corrals or yards for this work, but there is a world of the finest timber right at hand for such purposes and they should not cost very much. At present excepting what is grazed by the elk in the winter upon these meadows the feed upon them goes to waste. Some of it is eaten but as far as I could learn the best part of it is not touched.

It is difficult to see just where the federal government is really responsible for feeding or caring for the elk in this region. Under the various court decisions as to the ownership of game they belong to the State, the entire income from them goes to the State, and it has full control of their killing by sportsmen and hunters. I am informed by one of the state game wardens of Montana that on July 1, 1912, that state had over $65,000 in their treasury to the credit of the game fund for which they had no pressing needs even after spending large sums in stocking streams with fish, employing wardens,

etc. No figures are at hand to show whether the State of Wyoming had a surplus fund at the close of their fiscal year, but as that state last year raised the limit of the number to be killed by each person from two to three head on payment of an extra five dollars, this must have added very materially to the income of the State. The last report available of the Wyoming State Game Warden, that up to January 1, 1912, shows the amount secured for game licenses from only a part of the state was over $28,000; and the total was probably close to $40,000. In Montana for the year 1911 it was $55,000 At any rate the income to the states from their game resources are very considerable and it certainly seems as if it was not only their duty, but to their financial benefit to spend whatever sums may be necessary in protecting the elk from starvation. The money spent for hay and feeding the elk all goes into the hands of the citizens of the state; the destruction of their winter ranges is entirely due to the presence of the settlers who are themselves selling the hay to the state and the state gets the entire income from the game.

If the elk were under the absolute control of the federal government to be handled according to business methods and their killing by hunters properly regulated, there is no reason why they would not prove extremely profitable, allow all the hunting that should be and still keep the herd at the proper number for the range available for their use.

Economic Value of the Elk

In demanding for the elk further areas on which no other grazing should be allowed much stress has been laid upon the value of these animals as a meat producing resource. The stockman whose animals are deprived of their accustomed ranges believes there is a serious loss to the state, because his stock are producers of meat, hides, or wool, while the elk in his opinion produces neither.

In both the states interested in this question the grazing of live stock, especially sheep, upon the open ranges is one of the leading industries, large numbers of persons are interested in the business, and the money invested and also paid out for supplies and labor amounts to very large sums each year. Therefore any reduction of range for them which naturally entails a corresponding reduction in numbers (because there is practically no additional unoccupied range available for them) means a loss to the state in both taxable property and resources.

As far as the State of Wyoming is concerned the question of the exclusion of stock from certain ranges set aside for elk has not resulted in any disturbance of the balance between demand for range and the amount available. In that state no sheep have ever been grazed upon the areas in the Shoshone Forest east of the Park because of the nature of the country, and in the country south of the Park in the Teton Forest the range available for cattle is so understocked

that it will be many years before the demand from settlers for range for their domestic animals will use up the available range.

Sheep have never been allowed entrance into the Jackson Hole region by the settlers and it is doubtful if public sentiment will soon be changed sufficiently to enable any one to bring sheep into it for grazing on the public ranges. That portion of the Wyoming Game Preserve lying within the Targhee and Palisade forests on the western slope of the Teton range has previously been occupied as a sheep range by the Idaho sheepmen until it was set aside as a game preserve.

Taking the sheepman's side of the question it is a well-established fact that the average annual cost of running one sheep on the open ranges in the states in the vicinity of the Park is according to the report of the Tariff Board $2.25. This is the actual running expense, labor, forage, and other incidental expenses, practically all of which is paid out by the owners to citizens of the state.

Considering those areas set aside which may properly be looked upon as sheep ranges, it is probably conservative to estimate their carrying capacity for summer grazing at close around 50,000 head. There has been for several years past a strong demand for sheep range far beyond the limits of the land available either outside of the Forests or on them, and therefore that many sheep would naturally have been grazed had the range been open to them. It is therefore fair to assume

that the states interested are losers in various ways to an amount equal to the sums that would ordinarily have been paid out by the sheepmen. Taking the Tariff Board's figures as a basis this would equal $112,500 each year which would have been spent within these states for maintaining these additional sheep. The Tariff Board also estimates the annual income from each sheep in the Rocky Mountain region based upon the production of wool and mutton at $2.56. The Tariff Board's figures on the per capita value of sheep shows that for the region about the Yellowstone Park the value per head of sheep was found to be $4.51. The total investment per head, excluding lands, was $5.55. The Board did not consider the value of the lands used by sheep owners in making their estimates, but instead allowed their actual productive value so that their figures are not available for an estimate of the amount of investment in lands. However, in the year 1909 a committee appointed by the Montana Wool Growers Association to consider the whole question of the cost of wool production in that state reported that for every sheep owned in the State of Montana there was an average investment, including lands, improvements, equipment, and the sheep themselves amounting to $12.00. The 50,000 excluded sheep therefore represent an investment of $600,000, an average yearly income to the state through taxes and monies paid for supplies, labor, etc., of $112,500, and a yearly addition to the wealth of the state of about $128,000. On the other hand, it is exceedingly hard to estimate the actual

cash value of the elk to the states. This value comes from two main sources; their meat-producing capacity and the money spent by hunters in guides, outfit, etc. The income from game licenses is also an item. Taking the meat values, it is probable that an average elk killed in the proper season will weigh close to 600 pounds and dress between 250 and 300 pounds of meat. Elk meat being scarce, it would probably fetch on the market much more than other meats, but taking its actual meat value at a fair average for the usual market stuff it is likely that an average of 12 cents per pound for the dressed meat would be very nearly correct. This would give an average maximum value of $36 for each carcass killed for meat.

The total number of elk killed during the hunting season of 1911 is estimated at 3,500. This is, of course, an estimate, as it is difficult to obtain accurate statistics although each state law requires reports from game wardens, guides, and hunters as to the number of elk killed each year.

The Wyoming game warden estimates that 2,000 were killed in that state in 1911. No official data is available for the number killed in Montana in the Park region, but from game wardens, hunters, guides, and others interested in the matter, enough information was obtained to indicate a total of between 1,200 and 1,400 head. The number killed in the immediate vicinity of the town of Gardiner during the season is estimated by well posted men to have been close to 700 head.

In addition to the animals actually killed by hunters it is probably not far from the truth to estimate that ten per

cent more are wounded and eventually die of their wounds. Of this 3,500 head killed by hunters, probably 2,500 are actually utilized for food. Many are killed for their heads and being old bulls the meat is allowed to lie where killed, only the head being taken. Others are too poor in flesh to be eaten and a large number are wasted through early hunting when the weather is too warm to allow of the meat keeping until it can be eaten. This I was shown where the carcasses of 14 elk lay near the Sheridan Ranger Station on the Bonneville Forest, which were dumped from a wagon belonging to a hunting party in 1911. The meat had spoiled and could not be hauled any further.

I heard of several such cases; one of nine head, and others of less numbers. In the aggregate this must amount to a great many elk during the season. The remedy is of course to stop hunting so early as the month of September. Taking the meat value of the 2,500 elk actually used we have a total of $89,000.

To arrive at the amount paid for the hunting privileges we can hardly assume that each elk represents one permit owing to the fact in Wyoming the law allows two to be killed by each permittee and an additional one on payment of an extra five dollars.

In Montana but one can be killed. Besides this, many permits are issued to local residents who do other hunting than elk, while many permits for hunting go to men who never do any elk hunting whatever. Therefore the amount of money received by the states from game licenses can not be divided in any

satisfactory way so as to show what proportion should go to the credit of the elk.

In Montana if we accept 1,300 as the average number killed last season it means about that many hunters. In Wyoming probably the number of hunters is equal to one-half the number of elk killed or 1,000. Some of these hunters spent large sums in outfitting, hiring guides and other expenses. I have had estimates of this cost that ran as high as $2,000 for certain parties of eastern sportsmen who took into the hunting field large numbers of horses, guides, cooks, etc. On the other hand, I learned of hundreds of men who left towns like Livingston one morning, killed their elk within five or six miles of the Park early the next morning and caught the back train that day, having been absent from home but two short days. The expense of such a trip would probably not amount to more than $25.00. However, it is probably safe to estimate that on an average each elk killed represented an expenditure in the state of approximately $75 or a total of $97,500 for Montana alone.

If we accept $75 as an average, the amount spent by 2,300 hunters in killing the 3,500 elk during the season of 1911 amounted to about $172,500. The tables therefore would show the comparative values about as follows:

Elk Meat value of elk actually used	$89,000
Money spent by elk hunters	172,500
Value to State.....	$281,500

Sheep:

Estimated investment	$600,000
Money spent by owners for labor, supplies, etc.	$112,500
Income to owners from sale wool and mutton	128,000
Taxes paid on lands used for sheep estimated on 3 per cent basis	18,000
Total income to state from sheep	$258,500

This shows the elk somewhat ahead of the sheep as a source of revenue considered as a matter of figures. But it must be remembered that the money spent by hunters is not entirely an addition to the wealth of the country. Therefore in all fairness to both sides we must consider for purposes of comparison only the amount which each class of animals actually added to the wealth of the states interested. This is the meat and wool produced, and reverses the matter.

Value of elk meat used	$89,000
Value of mutton, wool and pelts produced by sheep	128,000

The sportsmen also insist that we should take into consideration the value to the state in the benefits received by the hunter in his out-of-door exercise in hunting, which is not a very tangible asset. There is a very considerable loss to the elk side of the question in the waste of hides none of which are saved because of the prohibition against their sale, on account of the danger that hide hunting will possibly become as bad as the tooth hunting.

Taken as a whole therefore the income producing powers of the sheep whose ranges have been given over to the elk are considerably higher than the elk. This leaves entirely out of

consideration the whole broad principle of the settlement of the west and its agricultural development toward which the stockmen of the west have contributed very materially. In fact the whole development of the greater part of the western states has come about through the pioneer development of the stockmen.

The proximity of the game tends to develop a class of men in the vicinity of these game areas who are nominally guides and trappers but whose real occupation is poaching and illicit trapping. They slouch through the forests dragging a pack horse or two behind them, have no permanent homes, pay no taxes, and add very little to the general upbuilding of the community.

No one would see the game wantonly destroyed or become extinct. But there must be a safe line at which this idea of game preservation can be drawn where the best interests of the country at large will be fully conserved.

Protective Game Laws

For many years there were no restrictive laws of any kind which protected the elk from hunters. They could be and were killed at all times of the year and in unlimited numbers. Eventually public sentiment demanded such laws and both Wyoming and Montana placed them upon their statute books.

There has been considerable wavering of policy in this matter, however, and the laws now enforced while offering protection to the elk to a certain degree are not as satisfac-

tory as they should be. In Wyoming the open season for elk is from September 1 to November 30, a three months season. In Montana it is from October 1 to November 30, a season of two months. This allows the hunters in Wyoming four weeks advantage over those in Montana. In Wyoming a hunter can kill two elk on his license and by paying an additional fee of five dollars can kill one more, making three in all. In Montana the law allows but one elk to each license. This again gives the Wyoming hunters an undue advantage. The opening of the Wyoming season in September is believed to result in the loss of many elk, because of the warm weather that generally exists during that month, which makes it almost impossible for hunters to get the meat out from the hunting grounds before it spoils.

The proper handling of this question depends very much on the game laws of the adjoining states and it is believed that one of the most important points to be considered is a uniform state law covering the opening and closing of the elk season and the number of elk each hunter may kill.

Beside the objection already given to September hunting the question of the rutting season is an important one in the maintenance of the herd. During September, according to the statements of those who are best acquainted with conditions, the rutting season is at its height and the animals should not be disturbed by hunting.

It is believed that in the three states surrounding the Yellowstone Park--Idaho, Montana, and Wyoming--an open

season for elk, of two months would be the most satisfactory one for all concerned. To make it cover but one month, October, as has been proposed by several, would give the hunters very little opportunity to secure an elk, for until the winter snows drive them from the higher ranges they would be fairly secure within either the Park or the game preserves. Therefore inasmuch as the hunting of the elk is one of the governing reasons for their preservation and hunting is also necessary to keep the number reduced to the safe range capacity, it would appear that a uniform ~~tow~~ two-months hunting season for these animals running from October 1 to November 30 allowing the killing of one elk to each hunter and one additional on payment of the fee of $5, would be acceptable to all interested in the matter. There should also be authority in the law giving the governors of the states the right to raise this number during any season not more than one animal to each hunter, or three in all, whenever upon the report of the state game wardens and the superintendent of the Yellowstone Park the natural increase in number of elk makes a reduction necessary in order to avoid overcrowding the ranges.

Any increase such as is contemplated must be agreed to by at least two of the three states interested.

With this number allowed each hunter it is believed the annual increase of the elk, allowing for the usual losses due to age and other natural causes, would be ample to keep the herd up to the number agreed upon at the meeting between

the Park Superintendent, representatives of the Biological Survey, and the Forest Service, page 49. This number, 50,000, is believed to be as great as the carrying capacity of the range available for elk will support and not be overstocked. With a herd of this size cared for as a cattleman would care for his stock by keeping them down to the capacity of his range and producing a reasonable amount of winter feed, the Yellowstone elk will furnish annually a surplus of about 7,500 or 8,000 head of mature elk for such uses as public sentiment may deem advisable. One thing is very certain in this entire question. If these elk could be turned over to some responsible stockman used to handling live stock on the open ranges and he be allowed to dispose of the surplus stock and use the available ranges according to his own unhampered judgment they could be made to produce a large amount of meat each year and he could afford to pay into the treasury of the three states a very considerable sum of money for the privilege and still have a good profit for himself.

Under normal grazing conditions a herd of 50,000 cattle should and will produce on the open range approximately 10,000 head of beef animals each year, and the elk should do the same. Allowing each elk a marketable value of only $25, we have a total of $250,000 which these animals might be made to produce under proper handling and business methods. I feel quite certain that if it were possible to handle the herd under such conditions plenty of western stockmen could be found who would be glad to enter into a contract to pay all expense of

caring for the elk, putting up hay for winter, protect them from poachers and illegal hunters, and pay the states and Federal government a large sum for the privilege. This plan is probably almost out of the question, because where three states and the Federal government are about equally interested it would be difficult, although not impracticable, to harmonize and bring it under one plan of management. From a conservation standpoint with a view to putting onto a paying basis a natural asset that today is almost wasted, this elk problem offers one of the finest opportunities in the entire west for some constructive legislation.

Public Sentiment

Public sentiment regarding the maintenance of the Yellowstone elk is divided along several different lines of thought. The hunters desire their protection and preservation in order to furnish a certain amount of out door sport, together with an opportunity to secure a class of meat that can not be purchased in the markets. The sentimentalist would preserve them from all injury just because they are wild animals and they delight to see them on the ranges free of all fear of mankind.

Many would have them preserved because they are a distinct asset to the community by means of which hunters and others are attracted to the region and spend large sums of money either as sightseers or tourists or else for the one purpose of hunting the animals.

The other, and in some ways the most aggressive advocates of elk preservation are the hunters, guides, and owners of the many hunting lodges scattered all over the Yellowstone region and whose prosperity depends almost entirely upon the plentiful and permanent supply of game as well as plenty of hunting grounds where there may be found horse feed and pleasant camping spots. This has come to be a distinct industry in that region with a large amount of invested capital and a great number of employees. Locally these ranches are known as "dude ranches" and the guests as "dudes," while the employees are designated as "savages." Besides there are numbers of hunters, trappers, and guides who operate independently. Game wardens consider many of these men as plain poachers and law breakers who need constant watching.

Opposed to these are the stockmen whose ranges the elk have to a greater or less degree either taken from them or else by their presence prevent their stock from utilizing it.

It is therefore very evident that the stockman stands almost alone in his position and also a fact that while the aggregate investment and yearly income to the stockmen amounts to a very considerable sum the business is in the hands of a comparatively few individuals, for assuming the number of sheep that might be accommodated with grazing on the excluded lands to be 50,000 the individuals controlling them would probably not exceed 20 or 25 at the outside.

Naturally many farmers who are now able to sell to sheepmen large amounts of hay and other winter feed should be somewhat interested in this matter. But they do not appear to have taken any active part in the discussion except to make vigorous protest against the marauding elk which when driven out of the Park by snow drift down into the valleys and break down fences and all ordinary corrals in their endeavors to get at the haystacks. Tales of farmers sleeping by their haystacks and fighting the hungry elk back with pitch forks are common all over the region. One or two notified the game wardens to come and drive them away or the elk would be killed in self protection. The wardens rather than risk a defiance of a law that possibly would not stand under such circumstances took steps to protect the haystacks of these men. In the final analysis, however, it is very evident that if it is to be left to a question of majority rule, the sheepmen's wishes must be subordinated to the desires of the larger number of people who are opposed to their use of these ranges and believe their highest use both to the individual and the state will be attained by reserving them for the use of the game.

But it is also evident that the stockmen by long priority of use of the ranges, not perhaps these which the elk now occupy but the general use of the Government's lands not otherwise reserved, have built up an industry which is one of the chief sources of the wealth of each of the interested states and that except for most cogent reasons no steps should

be taken which would tend to injure this business or the men whose money is invested in it, if it can be avoided.

Certainly the progress of the country must not be stopped through an unlimited extension of these vast areas for game purposes as opposed to the homesteader and settler. No one who looks at the matter from a standpoint of national development would hesitate to choose as between the game on one hand and the settlers' stock on the other, or ask that the whole region be allowed to go back to the Indian and the buffalo. But everybody agrees that up to a certain point the game must be protected and preserved and that of course implies sufficient ground on which they may graze unhampered by adverse conditions as far as may be guarded against.

The game enthusiasts have repeatedly charged the Forest Service with allowing the stock interests to dominate their actions in this respect, while the stockmen themselves are equally firm in their belief that we have ignored their pleas and heeding only the sportsmen's requests have continually crowded them back from ranges they have long occupied and to which they believe they are more entitled as producers of definite results in the way of wealth for the state and nation than the game. A study of the map attached to this report will show how fairly we have dealt with both sides.

Sportsmen's papers have been very aggressive in their attitude towards us in this matter and have repeatedly made statements which are far from the facts and truth. Thus

in one such magazine the following statement was recently made concerning the elk ranges north of the Yellowstone Park.

> "The Forest Service has leased Slough Creek, Buffalo and Hell Roaring creeks to the north of the Yellowstone Park, to the sheepmen, and as a consequence about 116,000 sheep were ranged along the north boundary of the Park all last summer, which, of course, destroyed all that part of the elk range."

The Absaroka Forest in which these three creeks are located is a long narrow strip of land covering almost one million acres and extends from the Park line north for about one hundred miles. It is divided into two areas, the northern part being separated from the southern part by a strip of non-forested land about twenty-five miles wide. The southern section is about fifty miles long from north to south and where it joins the Yellowstone Park boundary line on the south is approximately twenty-eight miles wide. The Park boundary line here is 52 miles long.

The total number of sheep grazed in the year 1912 on the entire Forest was 103,836 for a season of about three months in the summer from July 1 to September 30, and of this number but twenty-five thousand used those ranges on the watershed of the three principal streams which flow into the Yellowstone Park from the north. On pages 13 and 14 of this report it has been pretty conclusively established that the elk have never used this area above the line of the Jardine-Slough Creek trail. Hence it follows that the use of the land above this trail could have no bearing whatever upon the welfare of the elk.

Taking the range between this Jardine trail and the Park line, the Forest Service has always kept from all grazing

the agreed one-mile strip along the entire boundary. This amounts to approximately 20,000 acres immediately adjoining the Park but within the area of the Absaroka Forest on which sheep have never grazed under permit or with the approval of this Service.

On the balance of this area, or about 40,000 acres, no more than 7,500 head of sheep have ever been permitted to graze in any one season. For the season of 1912 these 7,500 were removed to other ranges and the entire area remained ungrazed excepting by a few head of cattle and horses, not over 50 in all, belonging to bona fide settlers who have homesteads along Slough Creek.

Thus the 110,000 head shrinks to an insignificant 7,500 and the removal of these had been practically decided upon by the officers of the Forest Service sometime before the publication of the article in question. The writer of the article could very easily have obtained the exact figures from the Supervisor of the Absaroka Forest had he cared to do so. While the other interests, such as the Biological Survey, the Park Superintendent, the sportsmen, and the game wardens naturally look only at one side of it the Forest Service must as far as possible protect the interests of all, giving each as much as its prominence and usefulness demands, heeding the sentimentalist as well as the practical business man and not allowing its judgments to be swayed by prejudice or unsupported statements.

As the matter stands today, the Forest Service through its control of the land involved in this controversy appears to be forced to solve this question and must act as an arbitrator between the several conflicting interests. It must be decided upon a broad business-like basis with a view to affording each side their fair and equitable share in the use of the public lands commensurate with its best utilization as one of our national resources.

Incidentally the sheepmen generally complained to me that while the Park authorities were asking for more room for the elk outside the Park boundaries, they were allowing the big stage transportation companies to graze during the entire season, often beginning as early as June 1, several hundred head of surplus stage horses. The area on which they are grazed is known as the "Blacktail" ridge, a large area about 10 miles east of Fort Yellowstone and acknowledged to be one of the best winter ranges for elk in the Park.

In answer to my inquiry as to this matter Colonel Brett admitted that the stage companies did graze their surplus stock on this area but in less numbers than the sheepmen claimed. His clerk gave me the number grazing there that day from their daily report as 200 head. Colonel Brett admitted that at times there might be more than this number but claimed that their use of the range made no apparent inroads upon the feed left for the elk. I had no opportunity to look into this matter further.

Cooperative Agreement on Elk Matters

On September 9, 1912, a meeting was held in the office of the Park Superintendent, Colonel Brett, U. S. A., at which were present:

Lieut. Col. Brett, U. S. A., Park Superintendent

Dr. T. S. Palmer, Biological Survey

Mr. D. C. Nowlin, Agent Biological Survey and for several years State Game Warden of Wyoming

Mr. C. H. Adams, Assistant District Forester, District No. 1

Mr. Will C. Barnes, Inspector of Grazing Forest Service.

Previous to this meeting each of these excepting Colonel Brett and Dr. Palmer, had made a personal field investigation covering very fully the ranges involved, while Colonel Brett and Dr. Palmer through their official duties were well acquainted with the whole situation.

The result of several hours discussion of the matter was the drawing up of the following agreement which was signed by each member of the conference. This agreement is thought to represent the best solution of the case possible. While it is of course not binding upon any person and it was not possible to secure the presence of the state wardens its provisions are believed to be so fair and based upon such sound principles that they will meet with the approval of the state officials and be a very effective basis for future legislation and concerted action between the various interests involved in the matter.

Memoranda of Points agreed upon at a Conference held at the Office of the Park Superintendent on September 9, 1912, represented by Doctor T. S. Palmer and Mr. D. C. Nowlin, of the U. S. Biological Survey; Lieut.-Col. Brett, Acting Superintendent of the Park; and Messrs. Barnes and Adams of the U. S. Forestry Service.

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1. That the whole elk problem should be handled as a unit.

2. That for the present the elk herd should be maintained at its present size, of about 50,000, of which the northern herd should not exceed 35,000.

3. That under present conditions the annual kill, or crop (killed under game laws of adjoining states, shipped, etc.) should not exceed 7,500 to 8,000.

4. That some equitable arrangement be made whereby the people of the State of Montana may derive their due proportion of the benefits of the herd.

5. That for the present the existing sheep grazing lines on the Gallatin National Forest be maintained.

6. That so far as the elk are concerned, the present lines on the Absaroka National Forest (Jardine-Slough-Creek trail) are reasonable and should be maintained.

(Signed) T. S. Palmer
" D. C. Nowlin
" C. H. Adams
" Will C. Barnes
" L. M. Brett,
Lt. Col. 1st Cavalry
Act. Supt. Y. N. P.

Clause 1 means that in considering any future methods of control or administration of the Yellowstone elk both herds, the Park and the Jackson Hole herd, should be considered as a unit and handled accordingly.

Clause 2 establishes the maximum size of the whole herd and also the maximum number of the Northern or Park herd.

Clause 3 definitely announces the number of surplus elk which may safely be removed from the whole herd during each normal year and still retain the proper numbers. This covers those killed by hunters and shipped to other states or other parts of the interested states.

Clause 4 refers to the question of more uniform game laws in the three interested states.

Clause 5 refers to the areas withdrawn from sheep grazing on the Gallatin Forest the boundaries of which have been agreed to by the sheepmen, the residents of the Gallatin Valley, and the game wardens of Montana.

Clause 6 refers only to the grazing of the elk on the areas now set aside, leaving open for further and future discussion if desirable the broad question raised by Dr. Palmer as to the sanitary questions involved in the grazing of sheep in any numbers whatever on the whole watershed covered by those streams that flow into the Park from the Absaroka Forest on the north. This also involves a small area in the extreme southwestern corner of the Beartooth Forest in Montana covering the watershed of Soda Butte Creek in the vicinity of Cooke City, but upon which no sheep have ever been grazed under permit from the Forest Service.

By the terms of this agreement certain definite results have been obtained which have been in controversy for several years. These are -

1. The definite limit to which the herds of elk should be allowed to increase;

2. The agreement as to the maximum number of surplus animals which should be taken from the herd each year in order to keep the natural increase within the maximum limits for the herd;

3. The tacit understanding that as far as the elk are concerned no further excluded or closed areas upon the adjacent National Forests would be necessary.

With these three almost vital points established and agreed to by the three branches of the national government most closely concerned, it would seem that a very considerable advance has been made in this matter of the elk ranges and therefore steps should be taken to secure the cooperation of the states interested in order that the agreement may be rendered more effective.

Disease Among Game Animals

One of the arguments advanced by certain game enthusiasts against the presence of the settler's stock, especially his sheep, in the vicinity of the Yellowstone Park is that various diseases have thus been brought onto the elk ranges, the game animals have thus become infected with scab and losses have followed. Nearly all the old timers and hunters

assert that about fifteen years ago or in 1896 and 7 some disease among the mountain sheep caused heavy losses among them and their numbers were greatly reduced. In the years 1902 and 3 the elk also appeared to be suffering from some parasitic skin trouble which according to reports caused considerable loss. Public opinion in the vicinity was to the effect that in each case the disease was scab and the animals contracted it from domestic sheep. The actual facts are that at that time and for some years previous no domestic sheep used the ranges in the vicinity of the Park and if the disease really was scab the game animals must have picked it up on some of the distant ranges to which they migrated during the winter.

Taking the two classes of animals under consideration scientific investigation has demonstrated almost beyond controversy that scab among sheep is not communicable to horses or cattle and that mange or scab among cattle is not communicable to other animals excepting those of its own class.

That the mite which causes scab among domestic sheep will thrive upon mountain sheep, seems established by the fact that a mountain sheep in the National Zoological Park in the city of Washington was according to Dr. Bailey of the Biological Survey found to be suffering from sheep scab. The mites taken from its hide could not be distinguished from those taken from domestic sheep suffering with scab, Bureau of Animal Industry Circular 193. This being the fact it would seem that the sheep raisers of the three states surrounding the Yellowstone Park

have more to fear from contamination by the mountain sheep than any one else because of the fact that the Bureau of Animal Industry charged with the suppression of sheep scab has pronounced those three states--Wyoming, Idaho, and Montana--to be free from sheep scab since the year 1907, although several other western states have been and still are in quarantine from this disease. If mountain sheep are infested with the scab they picked it up in the early days when they roamed almost unhampered and wintered in the more open deserts used by sheep, because it is a well known fact that until recent years, certainly not much before the year 1890, sheepmen would not occupy the mountain ranges, believing sheep could not be handled there with any degree of success. They did not begin to go to the mountain ranges in summer until the inroads upon the lower ranges and the development of the lamb trade forced them to do so.

As for the disease among the elk if it was scab from which they suffered they must have picked it up under the same conditions because mange among cattle on those ranges is an unknown trouble today, nor has it ever been observed as far as any authoritative reports may be found.

All over the southwest there has always been more or less mange among range cattle. There it is variously known as Texas, buffalo, or alkali itch. Stockmen who have given the matter any attention believe it is an heritage from the buffalo where, especially among the old bulls, there always existed some skin disease which affected them very like the mange does range cattle. They believed the domestic animals [illegible] up from

the old buffalo wallows and that it was scattered by the buffalo in their annual migrations north and south.

While scab or mange among cattle has never been found in the vicinity of the Yellowstone Park that area has been and still is the range of the buffalo and today in addition to the herd under control on the Lamar River there is a small band of the original wild buffalo running in the high mountains around the heads of the streams flowing into the Yellowstone River from the east. If the elk suffered from scab or mange and the mite is the same as that which produces mange in cattle and buffalo, it seems much more reasonable to believe they picked it up from their natural game neighbors than from the domestic animals. But the fact remains to be proven that the mite producing the mange from which the elk suffered is the same mite that produces the mange in cattle or scab in sheep. On this matter the only foundation for charging the sheep or cattle up with the elk mange is a very slight investigation made far from the scene of the trouble under circumstances which could not be accepted as final or even fairly reliable.

The following correspondence on this subject is interesting as throwing a better light upon the situation and in a measure clearing the domestic animals from this charge.

November 7, 1912.

Dr. H. W. Henshaw,
Biological Survey.
Dear Dr. Henshaw:

At the time of our meeting with Dr. Palmer representing your Bureau, at Fort Yellowstone, he repeatedly made the charge that through grazing the sheep upon the areas adjoining the Yellowstone National Park scab had been introduced among the elk

to their considerable injury. Dr. Palmer when asked for his authority for this statement, said that a hide had been taken from an elk supposed to have died from the disease, which, upon shipment to Washington, was pronounced scab by the experts of the Bureau of Animal Industry. I greatly doubted at that time that scab affecting sheep could be transmitted to elk, because so far as experiments have been carried the sheep mite does not thrive upon other domestic animals although they have grazed together in close proximity on the same ranges for many years.

I have looked into this matter somewhat and I should be very glad to have you inform me as to the basis for this statement by Dr. Palmer, and upon whose authority this decision that the sheep communicated the scab to the elk was based.

Very sincerely yours,
(Signed) Will C. Barnes,
Acting Assistant Forester.

November 12, 1912.

Mr. Will C. Barnes,
Acting Assistant Forester,
Forest Service.

Dear Sir:

In reply to your inquiry of November 7 regarding sheep scab on the Yellowstone Park elk, I can merely say that some years ago, probably in the winter of 1902 or 1903, a strip of hide affected with scab from one of the elk that had recently died in the Park, was sent us, and on examination in the Bureau of Animal Industry, the disease was pronounced "sheep scab'. Although the sheep mite does not ordinarily thrive on other domestic animals, it might readily happen that in winter when the elk are emaciated and in poor condition they might contract scab or other diseases from which they would be more or less immune at other times of the year.

Very truly yours,
(Signed) H. W. Henshaw,
Chief Biological Survey.

October 31, 1912.

Chief,
Bureau of Animal Industry.

Dear Sir:

During a recent inspection trip in the vicinity of the Yellowstone National Park to investigate the conditions regarding the elk on the

ranges within the National Forests adjoining the Park, the statement was repeatedly made to me by hunters and others interested in the preservation of the elk that large numbers of the elk had died in the past owing to the presence of mange or scab, which they believed was contracted from sheep grazing upon the ranges used by the elk. In answer to my statements doubting the possibility of the elk contracting scab from the sheep, I was informed that the hides from several elk supposed to have died from scab were forwarded to Washington to your Bureau for the purpose of ascertaining the disease from which they were suffering and that your Bureau had advised them as well as the Biological Survey that the hides sent in showed conclusively that the elk were suffering from scabies, the same as affects sheep on the western ranges.

I am greatly interested in this question because of its importance in deciding as to the future handling of the ranges now being used by the sheepmen, and which the friends of the elk believe should be wholly closed to sheep grazing as a means of taking care of the elk. I would be very glad if you would inform me as to the facts of this investigation into the scab and exactly what your findings were.

Very truly yours,
(Signed) Will C. Barnes,
Acting Assistant Forester.

November 6, 1912.

Mr. Will C. Barnes,
Acting Assistant Forester,
Forest Service, U.S.Dept.Agriculture.

Dear Sir:

Referring to your letter of Oct. 31 relative to scab affecting elk on ranges within the National forests adjoining the Park, you are advised that a search of our files shows that on Feb. 7, 1903, Mr. C. J. Jones, Game Warden, addressed a letter to Dr. C. Hart Merriam, Chief of Biological Survey, with reference to a skin disease of elk sending with it a piece of elk skin showing the lesions of the disease. A copy of Dr. Merriam's letter in reply, dated Feb. 20, 1903, reads as follows:

Your letter of February 7 came several days ago and with it the piece of elk skin. I have turned the latter over to Dr. Stiles,

the special expert of this Department on parasitic diseases of animals. Doctor Stiles finds that the disease is sheep scab. Doubtless the elk got it from grazing over ground which had been previously grazed over by sheep. It is curious that the bulls and not the cows should be affected. Doctor Stiles thinks that possibly the scab might be checked by putting out salt mixed with sulphur for the elk to lick. The regulation remedy for sheep scab, as you of course know, is dipping in a poisoned solution. In the case of elk this, of course, is impracticable.

The introduction of sheep scab among the elk is, of course, a very serious matter, and I shall be glad to receive from you further particulars as the season moves on."

There is no record that we can find other than this letter bearing on the diagnosis of the disease, and there is nothing to show how the diagnosis of sheep scab was arrived at. In view of the rather close restriction of the different varieties of scab and mange to certain species of animals, I should be doubt that scab in elk and sheep is the same disease, unless this should be proved by inoculation experiments. I consider that unless such experiments have been carried out further investigation will be necessary before the identity of the elk mange and sheep scab can be accepted as a proved fact.

Very respectfully,
(Signed) A. D. Melvin,
Chief of Bureau.

Therefore, as far as scientific demonstration seems to go the following is about the status of this charge against the domestic animals.

First. The mountain sheep probably did suffer from sheep scab but must have picked it up on ranges far distant from the Yellowstone Park region. Moreover, the sheep grazing in the states about the Park have been free from scab for six years past and the sheepmen have much more to fear from re-infection than any other interests.

Second. The elk undoubtedly did suffer from mange but it is not established by any fair methods of observation or investigation that they contracted the disease from either sheep or cattle and further it is fairly well established that the mites from sheep would not propagate themselves upon elk or such animals.

The Sanitary Side of this Question

The sixth clause of the agreement signed at Fort Yellowstone on September 9 was to the effect that -

> "So far as the elk are concerned the present lines on the Absaroka National Forest and Jardine-Slough Creek trail are reasonable and should be maintained."

This refers to the question of the pollution of the water supply of the towns of Gardiner, Livingston, Billings, and other communities located along the Yellowstone River from which they obtain their supply of water for domestic purposes. Dr. Palmer the representative of the Biological Survey made the argument that in his opinion the sheep should be wholly excluded from the watershed of the streams flowing from the north into the Yellowstone Park for the reason that the pollution of the water was the source of sickness in the towns below the Park, and mentioned the prevalence of typhoid fever at Gardiner as a justification of the charge.

Without entering into discussion as to this disease or its possible source, it may be frankly admitted at the start that typhoid did and does exist at Gardiner in an epidemic form;

and that the people of that town drink the water from the Yellowstone River. This is also true of some of the other towns lower on the same stream. Typhoid also exists or did exist this past summer at Fort Yellowstone where I understood at least one man died and several others were very seriously ill at the time we visited the post.

By examining the map accompanying the report it will be noted that Fort Yellowstone is located upon the Gardiner River, a branch of the Yellowstone, about five miles above Gardiner, which town is located upon the Yellowstone River about a hundred yards below its junction with the Gardiner River.

It should also be remembered that Fort Yellowstone has a sewer system which empties into a "sink hole" below the port and almost upon the edge of the Gardiner River into which as far as any ordinary observer can discover, the sewage from the Fort must eventually seep or perhaps flow directly through underground passages which are apparently numerous in that vicinity. Fort Yellowstone has a garrison of approximately 400 men and 600 horses and mules, while the large tourist hotel in the Fort not infrequently lodges over 1,000 people at a time, besides a host of servants, probably 200 on an average.

Again as a further light on this situation it must also be remembered that the water system of the town of Gardiner is a pumping plant operated by electricity and the intake pipe is in the Yellowstone directly below where the Gardiner River empties into it, in fact, not over three hundred yards from that point.

Moreover, between this junction point and the intake there may be counted six open privies along the river bank, belonging to residences along the bank, most of which have no vaults so that the contents are washed down into the river whenever it rains. There is also one stable above the intake from which all the refuse goes almost directly into the river.

Below the intake are many other such structures, together with at least three sewer outlets from hotels in the town and numerous stables directly on the bank, two with huge piles of manure, belonging to the stage companies operating in the Park. It is also the town dumping ground where all the rubbish and waste from the residences, hotels, and other places is hauled and dumped over the bluff. Here stray cows, hogs, and other town stock hunt through the rubbish for food; and also all the dead cats and dogs seem to be thrown there. Photographs were taken showing these points, which are not as satisfactory as they might be but were the best to be obtained at that time.

The natural inference therefore would be that if Gardiner and the rest of the lower Yellowstone cities are suffering from typhoid it can be traced more easily and directly to such water pollution instead of going so far afield in an endeavor to fix the responsibility on the sheep. Going into the cause of typhoid, it is a well-established fact that it originates and is carried from person to person in but one way, and that is through direct entrance into the human body of the typhoid germs which are only carried from the body of the infected person by means of the feces or like discharges. That

this source of infection has been accepted by every resident of Gardiner as the true cause of their typhoid troubles is established by the fact that no one living there drinks the water without first boiling it, and many will not drink it at all but depend upon imported water. Moreover, the town is now planning to carry the intake for their water system up the Yellowstone River some distance, so as to be above the point where the Gardiner River enters it, and thus avoid the possibility of infection from Fort Yellowstone. It may be stated without fear of successful contradiction, that until the representative of the Biological Survey made public his theory that the presence of the sheep on the headwaters of Slough, Hell Roaring, and Buffalo creeks was the cause of the outbreak no single person in that vicinity ever gave the matter the least consideration. Moreover, in order to make good on his statements to myself and others that he would start such a lot of talk and sentiment over the thing that we would be forced to remove the sheep in deference to public sentiment, he went to Helena, saw the governor, the state health officers, the railroad officials, and undoubtedly enlarged upon the conditions there with the sole view of working up such a hostile sentiment against the sheep that we could not withstand it and the sheep would be removed and his object accomplished.

Dr. Palmer made no secret to us of his intentions. He admitted that our contentions regarding the origin of typhoid were substantially correct; he admitted that it would be an easy

matter to start a stampede in Gardiner by making a very little public talk; and admitted that he was going to do it, because it seemed the easiest way in which to get rid of the sheep upon the Slough Creek watershed. He seemed to feel that by such means he was going to beat us in our stand against further exclusion of sheep from the Slough Creek ranges and that the ends justified the means.

Admitting for the sake of argument that there are 25,000 sheep upon the Slough Creek watershed and that during the three months of their presence there will be as herders probably thirty men in all. Briefly, Dr. Palmer's contentions were that the presence of the 25,000 sheep with the necessary herders to care for them was a grave source of pollution and disease and a menace to the health of the people living on the Yellowstone River below there. He was especially pointed in his criticism of sheep herders, their habits, etc.

What does Dr. Palmer propose to do with the unused range when the sheep have been excluded. He stated he wanted it for the elk and the hunters during the hunting season. In other words, he would exchange the 25,000 sheep for that many elk and probably three hundred and fifty humans in the shape of guides and hunters whom he did not mean to exclude. Granting that the human element might be a possible source of infection what would be gained by excluding the few sheep herders and still allowing the hunters and guides entrace to the area. Still further what would he do with the homesteaders already

there along Slough Creek, the camps of the soldiers on Slough Creek and other parts of the watershed in question. What would he do with the hundreds and thousands of campers and tourists who each year camp for weeks along these identical streams to fish and enjoy the scenery. What would he do with the citizens of Cooke City on the headwaters of Soda Butte Creek where privies and stables are numerous along the banks of the stream.

Passing by the human element in the trouble, what difference in pollution is there between 25,000 sheep grazing three months on this Yellowstone watershed and that same number of elk that now and always have used it for grazing the year round. The contamination of the water if contamination there is, which is not admitted by any means, must be four times greater from the elk than from the sheep because the droppings of the elk are more numerous and larger and their use of the streams much the same, as they run in large bands, even larger than any band of sheep grazed in the West.

In the winter of 1911 Colonel Brett according to his statements to us, had over 200 dead elk removed from the Gardiner River alone, between the Fort and the town, while hundreds more which were not removed were lying in the water or close to it along the other streams flowing into the Yellowstone and Gardiner rivers above the intake of the town's water supply.

If the real purpose of Dr. Palmer's fight is to secure pure water for the town of Gardiner it certainly seems as if the

field of endeavor open to him along several other lines is far and away in advance of this attack on the sheep. When all these sources of infection about the Gardiner water supply have first been taken care of if the typhoid fever still continues to menace the citizens of that and other towns below there on the river then an investigation into the grazing use of the area involved might very properly be made, but surely not by the Biological Survey.

Dr. Palmer's attitude in this matter when at Helena in conference with the state officials and District Forester Silcox was exactly the same and he again stated his position, which was that unless we excluded the sheep from this section the matter would be agitated to such an extent that some higher power, Congress, would take the matter in hand and segregate the area from the Forest and place it within the limits of the Park.

On my return to Washington Dr. Palmer informed me in answer to my question as to what he did at Helena, that he did exactly what he said he would, took the pollution matter up with the State officials of all kinds, the governor, game warden, health officer, and also the higher railroad officials of the Northern Pacific road and that as he put it, "believed he had started something."

If the water supply of the citizens of the State of Montana is seriously menaced it appears to me that it is the duty of the state authorities to attend to it. So far as is known they have not asked for the aid or assistance of the

Biological Survey, a Bureau which has no possible connection with any of the problems included in the health of any of the people of these United States in so far as their water supply is concerned. Whenever the state authorities feel that they need the help of the Federal government to handle this matter there is a Federal Bureau already organized and working under established Federal laws which cover all the sanitary questions involved in the pollution of the water supply of cities and the health of the citizens.

Moreover, we have the peculiar situation before us of one government official publicly criticising and antagonizing another set of officials who belong to the same department of the government and whose work should be correlated and friendly instead of the opposite.

Summary and Recommendations

Taking the subject as a whole, comparing the areas set aside for game animals with those used by the stockmen, as shown on the map attached to this report, there is certainly no justification for the charges that the Forest Service in its administration of the National Forests adjoining the Yellowstone Park, has been partial to any special interests or particular class of citizens. The area of Yellowstone Park is about 2,147,000 acres. To this we have practically added 1,300,000 acres more, for the sole purpose of taking care of the game.

To the contrary it seems to me we have handled the entire matter of the elk in a fair, just, and impartial manner. No steps have been taken without first giving every one an opportunity to be heard. No areas have been given over to the elk excepting those which careful investigation right on the ground proved to be absolutely necessary for their support.

If the domestic animals of the settler and stockman have finally been excluded from some areas it was done because it was well established that public sentiment in the vicinity demanded it.

If the exclusion of sheep from certain ranges caused a loss to the state as has been charged, it was done because the representative citizens of the state felt the loss to the state was made up in other ways which fully recompensed the commonwealth.

The charge that we have starved the elk by allowing the ranges to be grazed off by stock has not been proven.

Beyond all question ninety per cent of the winter ranges formerly used by the elk are not within any National Forest, but are now and have been for several years past occupied by the settlers and citizens of the various states whose farms and pastures now cover the range so fully that the elk have been driven back into the higher ranges where the snow occasionally falls so deep as to cover all their feed and thus they starve.

As for the ranges occupied by the elk in summer, we are furnishing vastly more summer range than the elk will ever use, even if allowed to double in numbers.

The charge that due to the reduction in their ranges etc. the number of elk is rapidly decreasing does not appear to be the fact, as the preponderance of evidence is distinctly to the effect that the elk are increasing at a very fair rate, barring occasional temporary setbacks due to unusual winter and range conditions.

The charge that we have allowed sheep grazing up to the Park lines by which means range previously used by elk has been destroyed is not proven. On the contrary, so far as I have been able to discover, not within the last six years, and I believe even before that, has a band of sheep been permitted to graze up to the Park lines, the mile limit having been kept absolutely clear of sheep. The only point at which

sheep have touched even this mile strip on the entire Park boundary of approximately 232 miles is the one along the northern boundary in the Absaroka Forest, where for a distance not exceeding twenty-eight miles at the outside, a total of 7,500 head of sheep grazed under permit for three summers, being removed by our orders at the end of the grazing season of 1911.

From an economic standpoint the meat of the elk if properly taken care of is a valuable commodity, and the annual production of meat from this source could be greatly augmented if proper, business-like methods of handling the elk could be established.

The state laws designed to protect the elk from unlawful hunting and at the same time furnish to hunters such an amount of sport as the herd will maintain are not based upon correct principles, and should be changed.

The sanitary questions involving the presence of typhoid upon the Yellowstone River watershed have no bearing upon this question, and should not be allowed to interfere with the proper administration of the National Forest adjacent to the Park until competent authorities have passed upon the merits of the case.

That after allowing for occasional seasons of heavy losses the elk as a whole are far better protected today even in their closer environment than ever before since the settlers began to fill up the region about the Park. This is due to the

game laws and other protective measures.

That if desirable enough hay can be cut upon the Park areas such as Slough and Buffalo creeks to winter every elk within the Park without in any way encroaching upon its use as a grazing area.

That several hundred head of horses belonging to the Yellowstone Park Transportation and Stage Company use an area of winter elk range which should not be grazed in this manner as long as it is necessary to ask sheepmen to remove their stock from Forest ranges because of a scarcity of elk feed on the Park.

That if winter feeding is really necessary to preserve the elk, both the states of Wyoming and Montana should more properly pay for the feed than the Federal government, because they alone receive all the income from the elk and the citizens of the two states profit through their presence.

That the number agreed as the maximum number is sufficient to preserve this species from extinction, furnish plenty of them for other parks and preserves and allow the hunters a large number of animals for sporting purposes.

That the number agreed upon as surplus and to be disposed of under various methods will not reduce the herd below the number agreed upon as a maximum but will be a positive benefit to the herd. That the further setting aside of areas within any of the National Forests surrounding the Park as game preserves either for winter or summer use is unnecessary.

That public sentiment taken as a whole in the region of the Park is generally against the stockmen's use of these ranges.

That the demand for the preservation of the elk comes strongest from those interests that desire the elk preservation not for scientific, sentimental, or utilization purposes but solely because their business interests will be advanced by that means.

That the statements in the press charging the Forest Service with favoritism in the use of the Forest ranges as against the elk have no basis in fact.

That scab among the mountain sheep may have been acquired from the domestic sheep but not from any herds within many miles of the Park boundaries.

That mange or scab among the elk did not and as far as veterinary science goes probably could not have been acquired from the domestic cattle or sheep.

That even granting that scab was brought to the elk by the domestic cattle it must have been picked up at very great distances from the Park, as such disease has never been known to exist on any of the cattle in the states adjoining the Park.

That it is not improbable the elk were infested with the scab mites by the buffalo now running on the Park or their predecessors.

That as a matter of fact the stockmen have more to fear from the reinfection of their herds by scab existing on the game than has the game from becoming diseased from the stock.

Recommendations

The Forest Service should make every reasonable effort to secure the passage of more satisfactory game laws which will be more uniform in each of the states.

No further extension of the excluded areas should be made until the Park authoities have exhausted every reasonable resource at their command to provide both summer and winter feed for the game animals in the Park.

Such exclusion should not then be made unless it can be clearly demonstrated that the needs are real, that the number of elk are absolutely necessary to keep the herd from becoming extinct and that the exclusion of stock from the areas will accomplish the desired results.

MAP TO ACCOMPANY REPORT ON ELK SITUATION IN VICINITY OF YELLOWSTONE NATIONAL PARK

SCALE OF MILES

0 10 20 30 40 50

LEGEND

CLOSED TO GRAZING OF SHEEP

STATE GAME PRESERVES (CLOSED TO ALL GRAZING)

CLOSED TO ALL GRAZING

Winter Range (Mundell)